

*Students' Perception, Familiarity, and Knowledge in the Use of Complementary and Alternative
Herbal Supplements in Health Promotion*

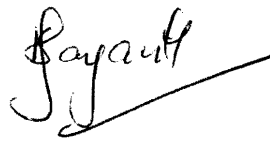
An Honors Thesis (HONRS 499)

by

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A handwritten signature in black ink, appearing to read "Jay Kandiah", with a long horizontal stroke extending to the right.

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July 2011

Expected Date of Graduation

July 2011

ABSTRACT

This study sought to examine perception, familiarity, and knowledge related to college students' use of herbal supplements in health promotion. Students at a Mid-Western university were invited to participate in a 12-itemized Perception, Familiarity, and Knowledge Survey (PFKS). The PFKS online survey included questions regarding demographics, perceptions of complementary and alternative medicine, familiarity, and knowledge of ginkgo, ginseng, St. John's Wort, garlic, echinacea, and cinnamon. Two-hundred and eighty-six college students successfully completed the study. Chi-Square analysis, showed that 80.8% of students were familiar with complementary and alternative medicine (CAM) ($p = .000$). Majority were familiar with ginkgo (82.4%), ginseng (96.1%), St. John's Wort (78.4%), garlic (98.4%), echinacea (65.6%), and cinnamon (96.8%). Despite familiarity of these herbs, 45.1% - 74.1% of the participants were unsure of the herb's effectiveness in preventing diseases or promoting good health. Only 43.3% had no prior knowledge of the six herbs. Students perceived barriers to CAM awareness were insufficient education (26.0%), lack of scientific evidence (25.9%), and lack of trained professionals (17.5%). Many students (85.8%) desired educational courses on CAM therapies, with nutrition professors being ranked highest by 88.0%. Over 60.0% of the students thought conventional medicine could benefit from CAM and that it should be integrated into healthcare practices. In conclusion, college-students appear to be highly interested in increasing their knowledge on CAM and herbal supplements, but currently have little experience and familiarity with herbal supplements.

Key words: Complementary and alternative medicine, herbal supplements, college students, perception, familiarity, knowledge

ACKNOWLEDGEMENTS

I would like to thank Dr. Jay Kandiah for her graciousness and thoroughness in advising me through this long and difficult process. It was her skills and abilities that made this an excellent experience. Her encouragement gave me the motivation to finish well. I want to thank Dr. Jim Jones, a statistician at the university, for his time and energy in assisting me with this task. I am very appreciative of his contribution and would not have been successful without his help. Lastly, I thank my parents and sister for their support, encouragement, and prayers.

INTRODUCTION

In 2007, the Department of Health and Human Services (DHHS) recorded trends of complementary and alternative medicine (CAM) within the United States among adults, children, and various ethnic groups in the National Health Statistics Report of 2007. It was found that 38.3% of adults living in the United States used some form of CAM, and 17.7% used herbal supplements. Herbal supplements, also known as, “nonvitamin, nonmineral, natural products,” is defined as, “products... taken by mouth and contain a dietary ingredient intended to supplement the diet other than vitamins and minerals. Examples include herbs, herbal medicine, [and] other botanical products” (1).

In 2006, Americans spent approximately \$15 billion on herbal supplements (1). According to the DHHS, the five most prevalent supplements used by adults in the United States were fish oil/omega-3, glucosamine, echinacea, flaxseed oil or pills, and ginseng at 37.4%, 19.9%, 19.8%, 15.9%, and 14.1%, respectively (1). Herbal supplements were used most commonly for the treatment of diseases and sicknesses such as back (17.1%), neck (5.9%), joint (5.2%), pain (3.5%), and arthritis. Seventy percent of users ranged between 40-69 years. Females were higher users with 21.9% using a “biological based therapy” – inclusive of herbal supplements – compared to 17.8% males (1). Eisenberg et al., compared trends of CAM from 1990 to 1997 and noted that those with college education were more likely (50.6%) to choose some form of alternative medicine, with herbal supplements being the largest (2).

Most research completed on the perception, familiarity, and knowledge of herbal supplements thus far have focused on mainly adults, children, or college students living overseas (1 – 14). However, there has been very limited research on the use of herbal supplements by college students residing in the United States. Review of literature on United States college-aged populations found that from a pool of 59 students who completed required or experimental

courses on herbal supplements, 50.0% had a higher perception and felt adequately knowledgeable on the subject (15). Harris et al. assessed 63 pharmacy students' perceptions, familiarity, and knowledge on herbal supplements and found that 73.0% were desirous to increase their knowledge (16).

According to the National Center for Complementary and Alternative Medicine (NCCAM), use of herbal supplements is increasing and will continue to rise in the years to come (13). With parents administering medicinal herbs to children as a preventative alternative to traditional drugs (10, 11), it will be interesting to assess the use of these products during the transitional stage into college life. Therefore, the purpose of this study is to research college students' perception, familiarity, and knowledge of herbal supplements in health promotion.

METHODS

Participants

College students enrolled during the first summer session at a Mid-Western university were invited to participate in an online survey. The inclusion criteria included being i) ≥ 18 years of age; ii) prior knowledge of herbal supplements; and iii) familiarity of CAM. The recruitment email informed participants of the following parameters related to the study: criteria for participation, purpose of research procedures, and time commitment related to the research. Subjects were informed by completing and submitting the survey, they were giving their consent. Duration for completion of the survey was two weeks. Prior to the start of the research, the University's Institutional Review Board approved all aspects of this project.

Instrumentation

The 12-itemized Perception, Familiarity, and Knowledge Survey (PFKS), developed by the researchers, was accepted for face validity by five registered dietitians (Appendix). Reliability was established by surveying a small sample ($n=30$) of students other than the study population

who were of similar characteristics. Subjects took the survey twice, with 1.5 weeks between each administration. Test-retest results were conducted from the same participants to assess similarity of answers to each test. The Kappa coefficient from the test-retest ranged from a low of .12 – 1.00, with a median coefficient of .47.

The PFKS included questions on demographics, perception, familiarity, and knowledge of herbal supplements. Demographics included: i) year in school; ii) gender; iii) major; and iv) ethnicity. Students' perception, familiarity, and knowledge of ginkgo, ginseng, St. John's Wort, garlic, echinacea, and cinnamon were assessed. A three point Likert-type scale was used to evaluate students' familiarity of the herbs. Students indicated if they had "Heard about the herb," "Heard and have used the herb," or "Never heard about the herb." Students assessed their perceptions on the effectiveness of these herbs in preventing diseases and promoting good health, by use of the Likert-type scale. Ratings were classified as "Effective," "Not effective," or "Unsure of effectiveness." Students' knowledge was evaluated by directing participants to match the use of the herbs in the treatment or prevention of various diseases and sicknesses. Perceived barriers to CAM awareness by students were assessed. The PFKS questioned whether CAM education should be provided at the university setting, and who participants thought would be qualified to teach the course. Finally, students were questioned on their perception of whether CAM could benefit conventional medicine, if CAM and conventional medicine should be integrated into healthcare practices, and whether the use of CAM modalities not supported by scientific evidence should be used in healthcare practices. Ratings were recorded on a Likert-type scale ranging from "Strongly agree" to "Strongly disagree."

Statistical Analysis

The Chi-Square test of association was used to examine class rank (frequency) of students and gender in relation to perception, familiarity, and knowledge of herbal supplements. Significance was established at $p \leq .05$.

RESULTS

Two-hundred and eighty-six college students (86 males, 23.8%; 276 females, 76.2%) successfully completed the online survey. Class rank of participants included 20.8% freshmen/sophomores, 36.1% juniors/seniors, and 43.0% graduates. Most subjects were Caucasian ($n = 323$; 88.7%), and few were either African American ($n = 8$; 2.2%), Hispanic ($n = 4$; 1.1%), Asian ($n = 15$; 4.1%), or other ($n = 14$; 3.8%) ethnicities such as Middle Eastern, biracial, Irish, and Polynesian.

There was an association between class rank and students' familiarity of ginkgo ($\chi^2 = 26.77$, $df = 4$, $p \leq .001$). Most graduate students (77.9%) were familiar with the herb compared to 46.0% of freshmen/sophomores and 65.1% of juniors/seniors. Unfortunately, there was no association between subjects' perception and knowledge of ginkgo in relation to class rank or gender (Table 1).

Chi-Square test revealed an association between class rank and the students' familiarity of ginseng ($\chi^2 = 9.89$, $df = 4$, $p = .042$). Interestingly, more juniors/seniors (37.0%) claimed to use ginseng while graduates (29.0%) and freshmen/sophomores (26.5%), were less likely to use it. Unexpectedly though, 57.5% of juniors/seniors had heard about the herb, compared to 70.2% graduates. Similarly, association was demonstrated by Chi-Square test in relation to students' familiarity of ginseng and gender ($\chi^2 = 12.89$, $df = 2$, $p = .002$). More males (49.3%) consumed ginseng, compared to 26.6% of females, while 69.1% of females and 47.9% of males had only

heard about the herb. Students' perception and knowledge of ginseng provided no significant data.

Associations were expressed between students' familiarity of St. John's Wort and class rank ($\chi^2 = 19.48$, $df = 4$, $p = .001$). More participants indicated their familiarity of St. John's Wort than expected, with responses consisting of 50.0% freshmen/sophomores, 57.9% juniors/seniors, and 74.4% graduates. Assessment of subjects' perception and knowledge on St. John's Wort were statistically insignificant.

The Chi-Square test revealed an association between class rank and gender with responses related to students' familiarity of garlic (Table 2). Fifty percent of freshmen/sophomores, 52.0% of juniors/seniors, and 42.0% of graduates had used the herb ($\chi^2 = 11.03$, $df = 4$, $p = .026$). When comparing gender, 59.2% of males and 43.6% of females had used garlic ($\chi^2 = 6.69$, $df = 2$, $p = .035$). Additionally, there was an association between gender and responses related to perception of garlic as a preventative medicine ($\chi^2 = 6.88$, $df = 2$, $p = .032$). Notably, 38.6% of males and 27.4% of females perceived garlic as effective. However, 47.1% of males and 64.3% of females were unsure of garlic's effectiveness as a preventative medicine. Data concerning perception and knowledge of garlic was statistically insignificant.

An association was observed between class rank and students' familiarity of echinacea, as revealed by the Chi-Square test ($\chi^2 = 24.90$, $df = 4$, $p \leq .001$). As expected, freshmen/sophomores were least familiar, with 56.0% indicating unfamiliarity with the herb. Juniors/seniors were second highest with 38.9% followed by graduates at 21.5%. More than one-third (31.5%) of graduates had taken the herb, compared to 19.0% of juniors/seniors and 8.0% of freshmen/sophomores. The Chi-Square test revealed associations between class rank and students' knowledge of echinacea. Results indicated that 70.0% of graduates, 50.0% of juniors/seniors, and 20.0% of freshmen/sophomores identified its use in disease prevention ($\chi^2 =$

20.74, $df = 10$, $p = .023$). This was surprising because many of the students from all class ranks indicated a low familiarity of echinacea. Perhaps the high correct response rate from graduates' was due to the popularity of echinacea in the 1990's (17), a time when current freshmen/sophomores may have been too young to understand or care about its potential effectiveness. No other data concerning perception of echinacea was significant.

As noted in Table 3, an association existed between class rank and perception of barriers to CAM awareness. These barriers included lack of media exposure ($\chi^2 = 9.84$, $df = 2$, $p = .007$), insufficient education ($\chi^2 = 8.60$, $df = 2$, $p = .014$), and limited availability in stores ($\chi^2 = 6.40$, $df = 2$, $p = .041$). Less than 25.0% (23.3%) of graduates stated they did not receive lack of media exposure as a significant barrier. However, freshmen/sophomores and juniors/seniors saw this as slightly more of a barrier (45.7% and 37.0%, respectively). Surprisingly, results indicated that 72.4% of juniors/seniors perceived inadequate education as a barrier to CAM. Interestingly, freshmen/sophomores and graduate students were fairly close in their perception (54.3% and 56.6%, respectively) of education as a barrier to CAM awareness. Limited availability of herbs in stores was significantly low as a potential barrier to CAM awareness. This view was shared by all class ranks with 87.0% of freshmen/sophomores, 82.7% of juniors/seniors, and 93.0% of graduate students in agreement. All other barriers to CAM awareness were statistically insignificant.

DISCUSSION

Several studies have investigated either perception, familiarity, or knowledge of CAM or herbal supplements among various groups of people. To date, little research has been conducted on all these factors as they relate to college students residing in the United States.

Results from this study in relation to perceptions of CAM were consistent with previous research. In 2005, Yeo et al. surveyed medical students where 92.0% believed that conventional

medicine would be more beneficial than CAM (3). In the present study, 82.5% agree with this statement, indicating their caution in the acceptance of all CAM therapies. In 2006, Harris et al. found that 53.0% of students discouraged use of CAM therapies if it was not supported by scientific evidence (16). However, this research showed that only 33.9% of students agreed that CAM use should be discouraged if there was a lack of scientific support. After 5 years, the proportion of students who demanded scientific evidence had decreased by 19.1%. A possible explanation for this could be due to more media exposure, more influence on children by parents who use CAM, more CAM education, or seeking answers outside of conventional medicine.

Students' interests in understanding and increasing their knowledge on CAM therapies were similar to former research (3, 16). When compared to previous investigators, there was a 5.8% increase in the number of students who believed that education on CAM should be incorporated into academia (85.8% vs. 80.0%) (16).

Results regarding students' knowledge of herbal supplements were similar to other research. In 2008, Xu found that respondents expressed great interest in herbal supplements but lacked knowledge on its uses (4). As earlier evidence have exhibited, subjects conveyed a high interest in learning and having more resources about herbal supplements, where as in the present study, students simply commented on their desire for CAM educational courses. A variety of majors (85.8%) stated that they wanted CAM courses. Congruency existed between past and present research related to participants' interest in CAM education, especially the efficacy of herbal supplements. However, research supports that most subjects had limited experience with herbal supplements with more than 50.0% ($n = 277$) of responses answering "unsure of effectiveness" (3). However, in contrast, Harris et al. recorded that a majority (65.0%; $n = 41$) of students viewed herbal supplements as moderately effective, revealing greater knowledge base and experience with herbal supplements (16).

Strengths of the study included ease of accessibility to the survey by participants' assessment of three parameters namely perceptions, familiarity, and knowledge of college students and evaluation of six commonly used herbs by college students. Some of the limitations were a low participant response rate and a lack of ethnic diversity. Future recommendations for research related to herbal supplements include: i) investigating the success of incorporating a CAM course into university curriculum as either a required or elective course; ii) clinical research on efficacy of specific herbal supplements in college population; and/or iii) effects of media on perceptions of CAM among college students.

CONCLUSION

In conclusion, college students had low levels of knowledge and experience with CAM yet maintained a high interest in receiving education on CAM. Additionally, they would like to see the use of CAM and conventional medicine in the healthcare setting.

Table 1: Students' familiarity on six herbs by gender.

Herbs:	Gender					
	Male			Female		
	Never heard of it	Heard about it	Heard about it and used it	Never heard of it	Heard about it	Heard about it and used it
Ginkgo	16.9%	64.4%	18.3%	18.0%	68.2%	13.7%
Ginseng	2.8%*	47.9%*	49.3%*	4.3%*	69.1%*	26.6%*
St. John's Wort	25.4%	56.3%	18.3%	20.7%	65.9%	13.4%
Garlic	2.8%**	38.0%**	59.2%**	1.3%**	55.1%**	43.6%**
Echinacea	42.3%	39.4%	18.3%	32.3%	44.0%	23.7%
Cinnamon	5.6%	38.0%	56.3%	2.6%	49.6%	47.9%

*p < .01

**p < .05

Table 2: Students' familiarity on six herbs by class rank.

Herbs:	Class rank								
	Freshmen/Sophomores			Juniors/Seniors			Graduates		
	Never heard about it	Heard about it	Never heard of it	Never heard about it	Heard about it	Heard about it and used it	Never heard about it	Heard about it	Heard about it and used it
Ginkgo	38.0%*	46.0%*	16.0%*	20.6%*	65.1%*	14.3%*	6.9%*	77.9%*	15.3%*
Ginseng	8.2%**	65.3%**	26.5%**	5.5%**	57.5%**	37.0%**	0.8%**	70.2%**	29.0%**
St. John's Wort	36.0%***	50.0%***	14.0%***	27.8%***	57.9%***	14.3%***	10.1%***	74.4%***	15.5%***
Garlic	0.0%**	50.0%**	50.0%**	3.9%**	44.1%**	52.0%**	0.0%**	58.0%**	42.0%**
Echinacea	56.0%*	36.0%*	8.0%*	38.9%*	42.1%*	19.0%*	21.5%*	46.9%*	31.5%*
Cinnamon	2.0%	42.0%	56.0%	5.5%	43.3%	51.2%	1.5%	51.9%	46.6%

*p < .001

**p < .05

***p < .01

Table 3: Class rank and students' perception of barriers to CAM awareness.

Barriers:	Class Rank		
	Freshmen/ Sophomores	Juniors/Seniors	Graduates
Insufficient scientific evidence	50.0%	60.6%	69.0%
Lack of trained professionals	43.5%	44.1%	40.3%
Lack of media/advertisements	45.7%*	37.0%*	23.3%*
Insufficient education	54.3%**	72.4%**	56.6%**
Lack of availability of herbs in stores	13.0%**	17.3%**	7.0%**
Expense of herbs	28.3%	20.5%	18.6%
Other	8.7%**	3.9%**	13.2%**

*p < .01

**p < .05

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Appendix: Perception, Familiarity, and Knowledge Survey

Please answer these questions to the **best** of your ability.

1. Major? (Write in)

2. Gender?
 - a. Male
 - b. Female

3. Year in school?
 - a. Freshmen
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Fifth year or higher in undergraduate degree
 - f. Graduate (i.e. MS, MA, PhD, etc.)

4. Race?
 - a. Caucasian
 - b. African American
 - c. Hispanic
 - d. Native American
 - e. Asian
 - f. Other, please specify. _____
 - g. Prefer not to answer.

Please complete the following questions entitled, “Students’ Health Perceptions of Complementary and Alternative Medicinal Herbs.” For the purposes of this study, complementary and alternative medicine is defined as “Approaches to healing not usually found in a doctor’s undergraduate training nor offered in public hospitals. Included are traditional medicines, practices and beliefs borrowed from other cultures, the so-called natural therapies, the plant-based medicines of homeopathy and herbalism, and manipulative techniques of chiropractic, osteopathy, and massage. It does not include physiotherapy, occupational therapy, or self-medication with non-prescribed treatments such as vitamins”

5. Have you heard of the term, “Complementary and Alternative Medicine”?
 - a. Yes
 - b. No
 - i. If **no**, thank you! Please hit the submit button to exit the survey.
 - ii. If **yes**, please proceed to the next question.

6. Please mark the appropriate box on your **familiarity** with each herb.

Herb:	Heard about the herb	Heard and have used the herb	Never heard about the herb
Ginkgo			
Ginseng			
St. John’s Wort			
Garlic			
Echinacea			
Cinnamon			

Herb:	Effective	Not effective	Unsure of effectiveness
Ginkgo			
Ginseng			
St. John's Wort			
Garlic			
Echinacea			
Cinnamon			

Herb:	Effective	Not Effective	Unsure of Effectiveness :
Ginkgo			
Ginseng			
St. John's Wort			
Garlic			
Echinacea			
Cinnamon			

[illegible]

10. Of the barriers listed below, which do you think is the strongest barrier to increasing use and awareness of complementary and alternative medicine (CAM)? **Check all that apply.**

- a. Insufficient scientific evidence
- b. Lack of trained professionals
- c. Lack of media/advertisements
- d. Insufficient education
- e. Lack of availability of herbs in stores
- f. Herbs are expensive
- g. Other, please specify. _____

11. Do you think there needs to be more education on CAM in university settings?

- a. Yes
- b. No
 - i. If **yes**, answer question 12.
 - ii. If **no**, continue to question 13.

12. Which professors do you think should be in charge of teaching information relating to CAM? **Check all that apply.**

- a. Nutrition
- b. Nursing
- c. Biology
- d. Health Science
- e. Physical Education
- f. Other, please specify. _____

13. Please indicate your ratings of these statements. There are five ratings ranging from “Strongly Disagree” to “Strongly Agree.”

Rating Scale:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Conventional medicine can benefit from CAM.					
Conventional medicine and CAM should be integrated into healthcare practices.					
CAM methods that have not been scientifically tested should be discouraged from conventional medical use.					

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Submitted To Ball State University IRB, Muncie, IN

Submitted by Caitlyn Zimmerman

Submission Date 05/20/2011

Submission Type Amendment/Modification

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Review Details:

Agenda	Review Type	Status	Effective Date	Expiration Date
06/01/2011 10:00 AM	Exempt Review	Approved	05/20/2011	

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Document Type	Description	Last Modified	View
Exempt Letter	Exempt Letter	05/20/2011 01:34 PM	

CITI Collaborative Institutional Training Initiative

Social & Behavioral Research - Basic/Refresher Curriculum Completion Report

Printed on 7/16/2011

Learner: Caitlyn Zimmerman (username: cazimmerman2)

Institution: Ball State University

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Department: Family and Consumer Science

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Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 12/30/10 (Ref # 5393308)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	12/30/10	3/3 (100%)
Students in Research - SBR	12/30/10	8/10 (80%)
History and Ethical Principles - SBR	12/30/10	4/4 (100%)
Defining Research with Human Subjects - SBR	12/30/10	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	12/30/10	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	12/30/10	5/5 (100%)
Informed Consent - SBR	12/30/10	4/5 (80%)
Privacy and Confidentiality - SBR	12/30/10	5/5 (100%)
Research with Prisoners - SBR	12/30/10	4/4 (100%)
Research with Children - SBR	12/30/10	3/4 (75%)
Research in Public Elementary and Secondary Schools - SBR	12/30/10	4/4 (100%)
International Research - SBR	12/30/10	3/3 (100%)
Internet Research - SBR	12/30/10	4/4 (100%)
Research and HIPAA Privacy Protections	12/30/10	7/11 (64%)
Workers as Research Subjects-A Vulnerable Population	12/30/10	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	12/30/10	0/2 (0%)
Ball State University	12/30/10	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and